

## REMARKS/ARGUMENTS

### Specification Objections

The Office rejected the specification as containing various typographical errors. The applicant agrees and amended the specification according to the examiner's suggestions.

### Claim Objections

The Office rejected **claims 4, 11, 17, and 19** as containing various typographical errors. The applicant agrees and amended the claims according to the examiner's suggestions. The office further objected **claim 8** as failing to further limit the scope of the claim from which claim 8 depends. The applicant agrees and canceled claim 8.

### 35 USC §102

The Office rejected **claims 1-3, 5, 8, and 16-20** as being anticipated by Campbell et al. (U.S. Pat. No. 6,182,469). The applicant respectfully disagrees, especially in view of the amendments herein.

As amended, claim 1 expressly requires "...a first pressure reduction device...configured to receive the liquid portion and to allow reduction of pressure of the liquid portion to provide refrigeration for a first cooler that is fluidly coupled to the separator and that is configured to allow cooling of a low pressure feed gas..." Similarly, amended claim 16 requires that "...the demethanizer is configured to receive the expanded liquid portion as demethanizer feed..." These elements are not taught by Campbell et al. Consequently, claims 1-3, 5, 8, and 16-20 should not be considered anticipated by Campbell et al.

It should be noted that the examiner's assertion that Campbell would teach that the liquid portion at reduced pressure would provide refrigeration for a first cooler that cools a low pressure feed gas to thereby form the cooled low pressure feed gas is factually incorrect. Indeed, such assertion is contrary to the teaching of Campbell as the liquid portion of the separator 11 provides heating to the absorber overhead stream. Feed gas cooling in the '469 patent is only performed using heated overhead stream 37a and demethanizer side reboiler streams 41 and 42.

Regarding the examiner's rejection of **claim 17** in the alternative as being obvious over Vijayaraghavan (U.S. Pat. No. 5,566,443) it is noted that amended claim 16 (from which claim 17 depends) requires that the separator is fluidly coupled to an absorber and a demethanizer, and that claim 17 requires an additional cooler to further cool the cooled low pressure feed gas. These limitations are clearly neither taught nor suggested in the '469 patent and '554 patent, alone or in combination. Consequently, claim 17 is not obvious over the cited art.

### **35 USC §103**

The Office rejected **claims 4-7 and 19-20** as being obvious over Campbell (U.S. Pat. No. 6,182,469). The applicant once more respectfully disagrees.

As amended, claim 1 (and with that claims 4-7) require "...a first pressure reduction device...configured to receive the liquid portion and to allow reduction of pressure of the liquid portion to provide refrigeration for a first cooler that is fluidly coupled to the separator and that is configured to allow cooling of a low pressure feed gas..." Similarly, amended claim 16 (and with that claims 19-20) requires that "...the demethanizer is configured to receive the expanded liquid portion as demethanizer feed..." These elements are neither taught nor suggested in the cited art.

Indeed, the presently claimed subject matter includes several and significant structural and functional differences. Among other things, liquid separated from the first separator has two destinations in the Campbell reference: The liquid is either sent to the inlet of exchanger 12 or to the bottom of the first column. In contrast, liquid 8 in claimed configurations is heat exchanged in exchanger 102 prior to entry into the second column, which substantially improves the overall fractionation efficiency and NGL recovery. Additionally, it should be recognized that the heat exchanger 102 is used to warm liquid stream 9 in exchanger 102 prior to being fed into the second column as stream 10. This exchanger is particularly beneficial in that (a) the refrigerant content in stream 9 is recovered by cooling the feed gas stream 6 to stream 4, and (b) the heating of stream 9 assists stripping of the C<sub>1</sub> components in the second column. Clearly, such advantage has neither been recognized nor suggested by Campbell. Consequently, the rejection of claims 4-7 and 19-20 should be withdrawn.

The Office rejected **claims 9-12 and 14-15** as being obvious over Vijayaraghavan et al. (U.S. Pat. No: 5,566,554) in view of Campbell (U.S. Pat. No. 6,182,469). The applicant once more respectfully disagrees. Indeed, the cited references merely provide an aggregated set of key words but fail to provide any motivation to combine.

For example, it is unclear to the applicant how Vijayaraghavan should be modified to include an absorber as the office failed to provide any specific details on which streams should be fed to the absorber at what conditions (temperature, pressure, source, etc.). Indeed, the '554 patent employs multi-stage vapor/liquid separation to provide relatively lean streams to the demethanizer whereas the absorber of Campbell provides a rich bottom product to a downstream demethanizer. Therefore, Campbell must rely on a cold absorber reflux stream (produced by cooler 12 and JT valve 13) while Vijayaraghavan need not use a 'third cooler'. Once more, it is pointed out that the presently claimed subject matter refrigeration content is extracted from the expansion of the liquid portions of the separator and absorber as well as refrigeration is provided by the exchangers 102 and 109 using specific process streams, which is neither appreciated nor suggested in the cited art. Therefore, and at least for these reasons, claims 9-12 and 14-15 should not be deemed obvious over the cited art.


The Office rejected **claim 13** as being obvious over Vijayaraghavan et al. and Campbell as applied above in further view of Campbell (U.S. Pat. No. 4,061,481). The applicant again respectfully disagrees. With respect to the combination of Vijayaraghavan et al. and Campbell the same arguments as provided above apply. The '481 patent does not remedy such defect, and the rejection of claim 13 is therefore improper and should be withdrawn.

**Request For Allowance**

Claims 1-7 and 9-20 are pending in this application. The applicant requests allowance of all pending claims.

Respectfully submitted,  
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